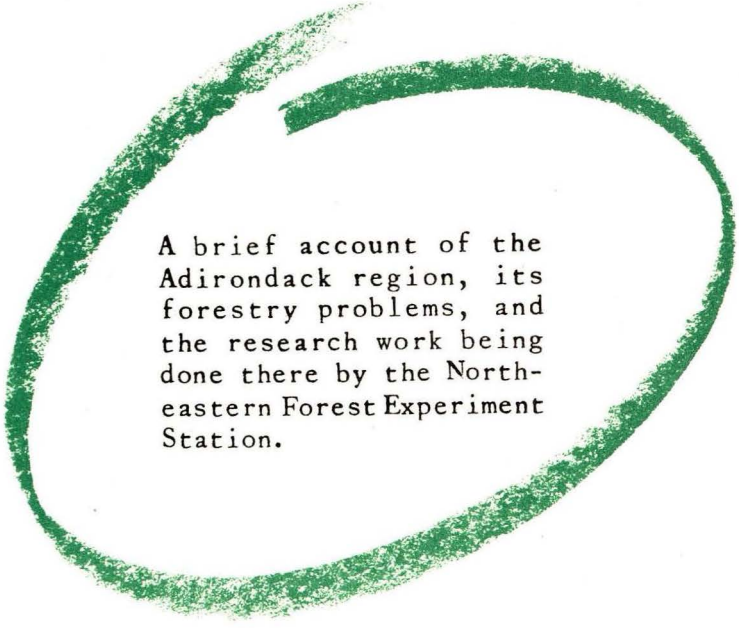
The ADIRONDACK Research Center


A brief account of the Adirondack region, its forestry problems, and the research work being done there by the Northeastern Forest Experiment Station.

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RALPH W. MARQUIS, DIRECTOR

The ADIRONDACK Research Center

by

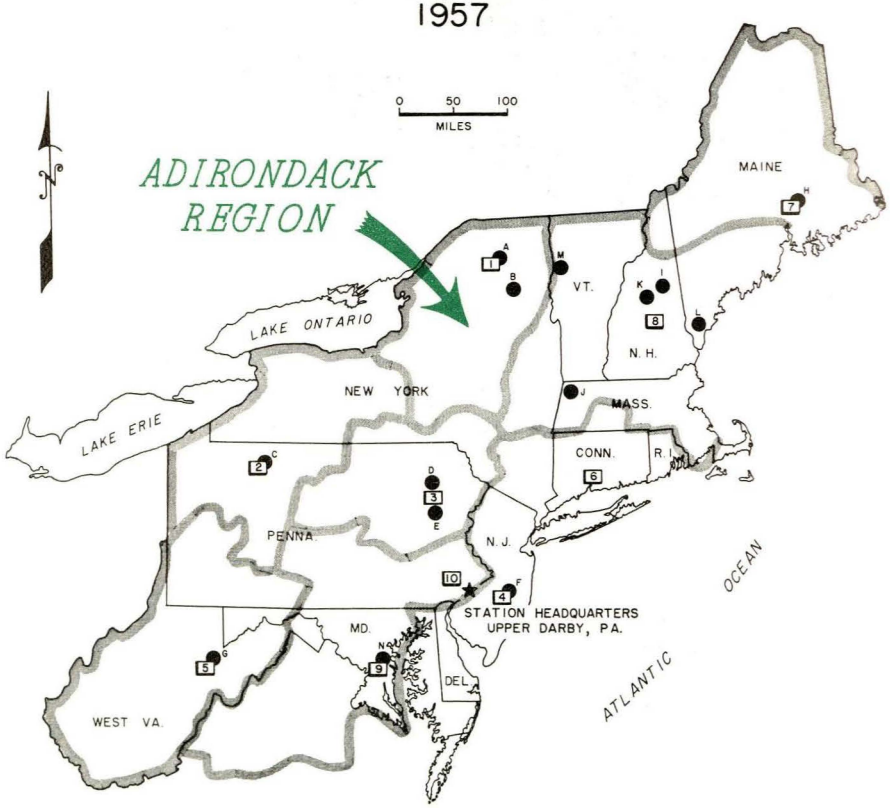
Francis M. Rushmore, *Forester*

Northeastern Forest Experiment Station
Forest Service, U.S. Dept. Agriculture

SOME of the first forest research done in North America was done in that lake-spangled land of forests and mountains in upper New York State that we know as the Adirondacks. The very name Adirondacks smacks of forest. The big Webster dictionary says that Adirondacks comes from a Mohawk Indian word, Hatirongtaks, which means literally, "they eat trees."

Pinchot and Fernow did some of their earliest work in the Adirondacks; and in more recent times the U.S. Forest Service did some research in this region. But much of this early work was fragmentary; and after World War II, when the U.S. Forest Service expanded its research program in the

REGION SERVED BY THE
NORTHEASTERN FOREST EXPERIMENT STATION
1957



RESEARCH CENTERS AND FIELD LABORATORIES

1. ADIRONDACK CENTER (PAUL SMITHS, N. Y.)
   - A. PAUL SMITH EXPERIMENTAL FOREST
   - B. FINCH PRUYN EXPERIMENTAL FOREST
2. ALLEGHENY PLATEAU CENTER (KANE, PA.)
   - C. KANE EXPERIMENTAL FOREST
3. KINGSTON CENTER (KINGSTON, PA.)
   - D. POCONO EXPERIMENTAL FOREST
   - E. DILLDOWN EXPERIMENTAL FOREST
4. COASTAL OAK PINE CENTER (NEW LISBON, N. J.)
   - F. LEBANON EXPERIMENTAL FOREST
5. MOUNTAIN STATE CENTER (ELKINS, W. VA.)
   - G. FERNOW EXPERIMENTAL FOREST
6. FOREST DISEASE AND INSECT LABORATORY (NEW HAVEN, CONN.)
7. PENOBSCOT CENTER (BANGOR, ME.)
   - H. PENOBSCOT EXPERIMENTAL FOREST
8. WHITE PINE-HARDWOOD CENTER (LACONIA, N. H.)
   - I. BARTLETT EXPERIMENTAL FOREST
   - J. HOPKINS EXPERIMENTAL FOREST
   - K. HUBBARD BROOK EXPERIMENTAL FOREST
   - L. MASSABESIC EXPERIMENTAL FOREST
   - M. BURLINGTON, VERMONT, LABORATORY
9. VIRGINIA PINE-HARDWOOD CENTER (LAUREL, MD.)
   - N. BELTSVILLE EXPERIMENTAL FOREST
10. MORRIS ARBORETUM (CHESTNUT HILL, PA.)

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NORTHEASTERN FOREST EXPERIMENT STATION

The Adirondack Research Center is concerned with forestry problems in a 14-million-acre area in northeastern New York. This Research Center is one of the field laboratories operated by the Northeastern Forest Experiment Station.

Northeast, a need was felt for a broad-scale, long-range research program to attack forestry problems in this region.

In 1948, after a search for lands suitable for this purpose, the Forest Service entered into a cooperative agreement with Paul Smith's College, at Paul Smiths, N. Y. The College agreed to lease a 2,300-acre tract of forest land to the Northeastern Forest Experiment Station for research "...for the economic benefit of the Adirondacks and adjacent forest regions having similar forest conditions."

So in August 1948 the Experiment Station established a new research center in the Adirondacks, with its headquarters on the campus of Paul Smith's College.

The Adirondack Research Center is one of nine field laboratories operated by the Experiment Station. The research work done at this Center deals primarily with management of the forest types that are typical of the Adirondacks and adjacent forest lands in Vermont.

The Adirondack Forests

THE Adirondack Research Center has two forest tracts available for its studies. One is the 2,300-acre tract leased from Paul Smith's College, which is known as Paul Smith Experimental Forest. The other is the Finch Pruyn Experimental Forest, near Newcomb, N. Y., which was established in May 1934 in cooperation with Cornell University.

Research carried on at the Adirondack Research Center is designed to serve the forestry needs of a 14-million-acre area in northeastern New York. Although forests cover 60 percent of the 14 million acres, the stands on 13 percent of this area are either unavailable or unsuitable for commercial forest use. Most of the larger tracts of productive timber lands have been in the possession of individuals or pulp-and-paper companies for many years. Most of the non-commercial forest is in publicly-owned parks that are closed to commer-

cial timber operations. Farm forests are less extensive here than in other parts of the Northeast, most of them being on the fringes of the mountains.

The forest types found in this region are strongly related to topography and soils. Topography ranges from plateaus and foothills to steep mountains more than 5,000 feet high. Soils are varied: generally they are thin, stony, and acid; and they are better suited to forests than to agricultural uses.

Lumbering began here in the early 1800's. The loggers first cut the big pines and spruce for lumber, and spruce for pulpwood. By 1850 they had penetrated to the central Adirondacks. High-quality hard maple and yellow birch have found ready markets since 1920, and some of the most inaccessible tracts are now being logged for these valuable hardwoods. However, markets for beech and soft maple are practically nonexistent in the central Adirondacks.

The selective kind of logging that was done here has had an effect on the composition and quality of the present growing stock. For example, softwoods have been almost eliminated from some mixed stands. Some cutover areas are now providing their second and third cuttings of hardwoods--hardwoods that are made merchantable mostly by improved economic factors. Only 100,000 acres in the area have not been cut over.

With the softwood pulpwood supply diminishing, some paper mills have been abandoned and others have converted to hardwoods. The swing to hardwoods has occurred within the last 5 years, and no doubt it will become stronger within the next 5 years. One large paper mill has explored the slab-wood supply and is now obtaining one third of its chip requirements from debarked slabs.

A few of the more important characteristics of the forests in the region served by the Adirondack Research Center have been summed up as follows:[1]

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[1]Ferree, Miles J., and Davis, James E. Forest acreage and timber volume in the Adirondack and Catskill regions. N.Y. State Univ. Coll. Forestry. 1954.

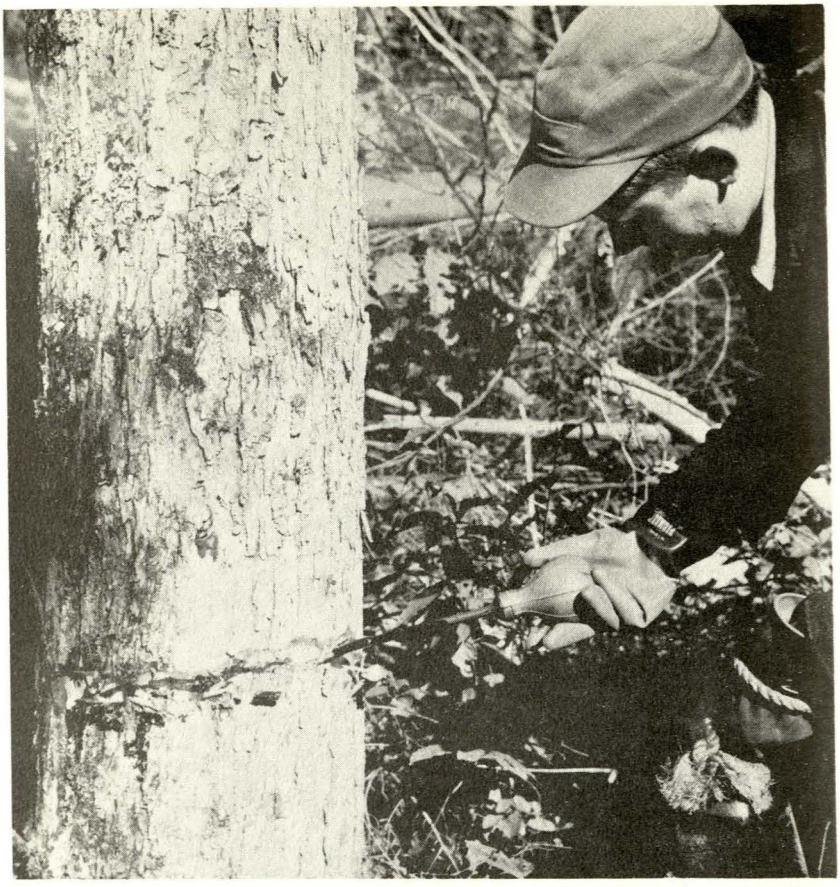
Stands of 95-year-old white pines like this one near Paul Smiths generally have dense understories of balsam fir and red spruce. After the pines are cut, there is little chance of pine regeneration --even if there is a good seed source. The understory softwoods might produce a future crop of timber.

Large white pines were cut 50 years ago on this area, releasing understory balsam fir and red spruce, which grew to pulpwood size. A few pines came in here.

Repeated cutting for softwoods has left this site occupied by hardwoods, many of poor quality. This stand once contained large overstory white pines.

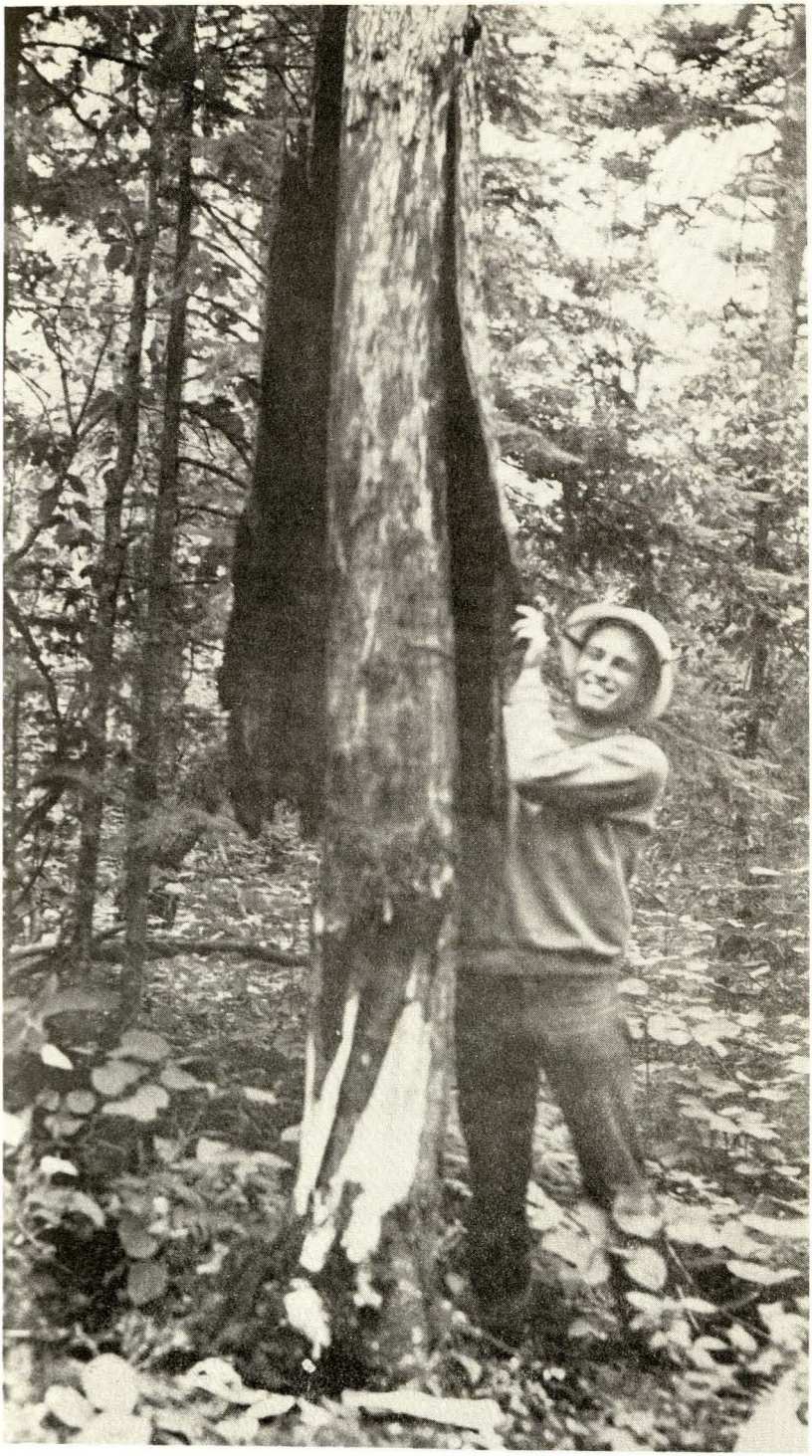
Mature timber is rapidly disappearing in the Adirondacks. Some research effort should be devoted to study of younger stands.

Regardless of their quality, cutover timber stands will have to produce timber products for the future. How should they be managed? Which species are desirable? Should investments be made now to improve such stands?



Sodium arsenite applied to a frill in summer will cause the bark to peel by the following spring.

How the bark peels from a 10-inch red maple treated the previous summer with sodium arsenite. Live streaks below the frill generally die within a few years.



Forest types.--Hardwoods occupy 2,500,000 acres (55 percent of the total forest acreage), mixed conifer-hardwoods occupy 1,400,000 acres (32 percent), and conifers occupy 500,600 acres (13 percent).

Abundant species.--Hard maple, yellow and white birches, beech, red maple, red and black spruces, balsam fir, white pine, and eastern hemlock are the abundant species.

Less-abundant species.--Red and pitch pines, tamarack, white cedar, white spruce, trembling and largetooth aspens, northern red oak, gray birch, fire cherry, American elm, basswood, white ash, and black cherry are also found in this region but are less abundant.

Timber size classes.--Seedlings, saplings, and poles occupy about one third of the forest area and sawtimber occupies the remaining two thirds.

Merchantable sawtimber volume.--This amounts to 16 billion board feet, about equally divided between hardwoods and softwoods. Over half the volume is on the State Forest Preserves and much of the total volume is not merchantable by current utilization standards.

Net annual merchantable growth.--This amounts to 330 million board feet or 2.1 percent of the total volume.

The Job for Research

THE improving demand for forest products and technological advances in utilization will give forest owners better opportunities for profitable forest management in the Adirondacks. But before they can take full advantage of these opportunities they must have better knowledge of the silvical and ecological requirements of the commercial species common to the area. Owners need specific and detailed information about the soil and topographic elements of forest sites. Many sites must be relieved of their burden of poor

growing stock to increase the stocking of more desirable trees. Research can and should obtain this information and from it develop methods that will enable forest owners to obtain greater returns from their lands.

Adirondack Hardwoods Deserve Consideration

Hardwood stands, which occur on 55 percent of Adirondack timber lands, now are supplying some of the best yellow birch and hard maple in the Northeast. Although cutting is proceeding at a rapid pace and many high-graded stands exist, the hardwoods here are probably in no worse condition than the average in other parts of the Northeast. One major difference exists: the Adirondacks possess cutover old-growth hardwood stands while other regions possess younger stands. This creates quite different management problems.

The Small And Less Desirable Hardwoods

Progress in improving stand composition, growth, and quality could be made if markets existed for small hardwoods. The snowballing trend toward increased use of hardwoods for pulp is in the right direction, but most of the mills that do this are on the fringes of the Adirondacks--60 to 100 miles from the area where the stand-improvement problem is so critical. New hardwood pulp mills actually are in a position similar to that once enjoyed by pioneer sawmills; that is, their supplies are close to the mill. Consequently, they provide a market only within a limited local area. Should stand improvement in the remote Adirondack areas be delayed until a market for small products develops? Some timberland owners think not, and already have made substantial investments to improve their stands by destroying unwanted hardwoods.

What About The "Worthless" Hardwoods?

Even with a striking improvement in markets for small-sized products, there would still be unmerchantable culls and weed species. Should the forest manager ignore

these trees--wait for them to die--meanwhile permitting them to exert their adverse influence upon the stand? Or, should he make a capital investment in destroying them, with the expectation of getting a reasonable return from the resultant benefit to the better trees?

Red maple and beech could properly be considered weeds on those adverse sites where they will not produce sound products. On better soils, they may be worth tolerating--at least to pulpwood size--unless the woodland manager decides it is better to sacrifice them to permit faster development of more desirable species. But even on the better hardwood sites in the vicinity of Paul Smiths, only about 25 percent of the beech can qualify as reasonably good growing stock. Economical methods of destroying unwanted trees will be in greater demand as management becomes more intensive.

Look To The Cutover Stands
And The Young Stands
For Future Products

As would be expected, early forest management studies were aimed toward answering questions about mature stands. With the old-growth stands fast disappearing, more research attention should now be given to the handling of cutover, second-growth, and old-field stands. With the increasing demands for wood products, the management of young Adirondack stands will become more intensive, and there will be more demand for information on how to manage them.

Reclamation Of Softwood
Sites Stocked Principally
With Inferior Hardwoods

There are numerous stands in the Adirondacks that contain understory balsam fir and red spruce with an overstory of 40- to 80-year-old red maple of poor quality. Here are some of the management questions that should be answered: What is the quality of the overstory hardwoods, and will they be sound when they reach merchantable size? What can be done to improve these stands? Do the understory softwoods offer a good source of growing stock, or will they deteriorate before reaching merchantable size? How will the under-

story softwoods react to release? Should release be rapid or extended over a considerable period? Is planting tolerant softwoods one solution where suitable natural reproduction does not exist?

White Pine Management

Locally, white pine grows well and is a valuable species; a few magnificent specimens 265 years old, 45 inches d.b.h., and 160 feet tall still remain. The species is reproducing now mainly on abandoned fields. In the Lake Champlain vicinity and southward, conditions are more favorable for it to succeed itself. Considerable progress with management studies has been made on the Pack Forest by the New York State University College of Forestry at Syracuse.

Two important questions about white pine management in the Adirondacks are: What techniques will perpetuate white pine? What soils, sites, species composition, and other biological factors are favorable for perpetuating white pine?

Elsewhere other species--frequently balsam fir--occupy understories in pure pine stands 80 to 95 years old. Problems pertaining to white pine management in other regions also exist in the Adirondacks.

Insects, Diseases, And Weather

Timber losses caused by insects, diseases, and weather are problems in the Adirondack region, just as they are in other forest regions. We do not know whether the degree of damage caused by these factors is related to stand history, or whether their effects can be diminished by manipulating the stands. Until better remedies are found, woodland owners probably will follow their current practice of harvesting individual trees that they believe might succumb to insects, diseases, or windfall before the next harvest.

We need to learn more about species tolerance to all these elements and their occurrence in the region so that we can determine if forest composition can be directed toward more resistant forms.

Recreation Also Is Involved

The recreational values of forest lands in the Adirondacks potentially are among the highest in the Northeast. The abundant clear lakes and streams, remote areas accessible by well-marked trails, and the general appearance of the Adirondacks attract both summer and winter visitors. Recreational pressures probably will increase tremendously in the immediate future. More leisure time of an expanding urban population, better roads, improved access to water sites, and the posting of private lands outside the Adirondacks will help further this trend. One might speculate about the degree of competition that could develop between demands for recreation and demands for wood products.

Any major conflict between high-volume timber production and recreational uses must be solved, particularly for the high mountainous area. Increasing recreational pressures are being exerted upon private forest lands that still are open to the public. It is debatable how long these lands will remain open; many already have been posted--some to provide income by leasing to sportsmen and others because actions by the public have become intolerable.

To supplement the income from forested lands, harvesting methods and silvicultural measures that are aesthetically acceptable or desirable from the recreational viewpoint (or productive for game-management purposes) might even justify a slight lowering of timber yield, if that were necessary. Such income might also be used to help rehabilitate forest lands.

Present Research Program

A START has been made in seeking solutions to some of the forestry problems in the Adirondack region. At present the Research Center staff consists of three permanent employees: a research forester and two assistants. In addition

to the permanent personnel, a few forestry students are usually hired for the summer season to help with the field work. A brief outline of our research program will indicate the nature of the work now under way.

Compartment Experiment

This is an experiment in applied silviculture and practical forest management. It is designed to simulate commercial harvesting operations and is expected to provide economic and biological evaluations of several intensities of management.

Stand-Improvement Techniques

Studies are being conducted to improve current techniques and to develop new techniques for deadening large (over 6 inches d.b.h.) cull hardwoods. Simplified mechanical methods and minimum-effort wounding techniques for applying silvicides are being sought to reduce costs while maintaining effectiveness.

Other Studies

Three methods of cutting hardwood stands are being tested. These will provide information about the growth of residual trees, tree reproduction, and the effects of deer browsing upon hardwood reproduction.

Commercial clear-cutting and several degrees of selection cutting will be evaluated from long-term measurements and analysis of growth of the residual trees.

Farm-forest demonstrations in progress are designed to provide useful information for owners of small forests in this vicinity.

Experimental plantings of tolerant softwoods beneath poor hardwoods are expected to provide preliminary information about this management technique.

Our Debt to Cooperators

FOREST Research in the Adirondack region has benefited from a healthful cooperation among Federal and State agencies, the universities and forestry schools, industries, and private landowners and individuals and institutions. The effect of this cooperation is to organize and integrate the total research effort, avoid duplication of effort, and make the research money go farther.

The cooperation received from Paul Smith's College in leasing the land for our Experimental Forest has already been mentioned. We might add that the College also provides office space, utilities, and other valuable services. The contribution of Cornell University in leasing the Finch Pruyn Experimental Forest has also been mentioned.

Another formal cooperative agreement was made in 1957 with the New York State University College of Forestry, at Syracuse, which facilitates a cooperative experiment in hardwood silviculture.

Several informal cooperative agreements have also contributed to our research effort. Finch, Pruyn and Company have made available study areas and have cooperated in the establishment of two silviculture experiments. The International Paper Company has cooperated in the establishment of plots for studying yellow birch decadence. Cornell University Agriculture Experiment Station assisted in the preparation of a soils map for the Paul Smith Experimental Forest. Earl L. Stone, Jr., of Cornell University, is cooperating on a forest-site-classification study. The St. Regis Paper Company established a sustained-yield management unit on their Northern New YorkExperimental Forest about 1950; and Station personnel have assisted in planning the management practices. The Forestry Department and students of Paul Smith's College in 1957 made an experimental planting of hybrid seedlings produced by Station geneticists. And foresters for large private woodlands and State foresters have conducted pilot tests of silvicide techniques developed at the Research Center.

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